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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:
Mark Wetzel
Michel Haddad
Joseph E. Peck
Christopher A. Clark

Serial No. 10/014,638

Filed: October 26, 2001

For: INSTRUMENTATION SYSTEM INCLUDING A BACKPLANE HAVING A SWITCHED FABRIC BUS AND INSTRUMENTATION LINES

§ Group Art Unit: 2112
§
§ Examiner: Vu, Trisha U.
§
§ Atty. Dkt. No.: 5150-51201

CERTIFICATE OF MAILING
37 C.F.R. § 1.8

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Mark S. Williams
Name of Registered Representative

5-18-05 Mark S. Williams
Date Signature

APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir/Madam:

Further to the Notice of Appeal filed March 18, 2005, Appellant presents this Appeal Brief. Appellant respectfully requests that this appeal be considered by the Board of Patent Appeals and Interferences.

I. REAL PARTY IN INTEREST

The subject application is owned by National Instruments Corporation, a corporation organized and existing under and by virtue of the laws of the State of Delaware, and having its principal place of business at 11500 N. MoPac Expressway, Austin, TX 78759-3504, as evidenced by the assignment recorded at Reel 012382, Frame 0189.

II. RELATED APPEALS AND INTERFERENCES

No other appeals or interferences are known which would directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

Claims 1-39 are pending in the present application and Claims 1-39 are the subject of this appeal. Claims 1-39 stand finally rejected under 35 U.S.C. § 103(a). A copy of Claims 1-39, as on appeal (incorporating all amendments), is included in the Appendix hereto.

IV. STATUS OF AMENDMENTS

No amendment to the claims has been filed subsequent to the final rejection. The Appendix hereto reflects the current state of the claims.

V. SUMMARY OF CLAIMED SUBJECT MATTER

A system that extends channel-based switched fabric architectures to accommodate instrumentation systems and functionality is disclosed. In one embodiment, the instrumentation system may comprise a chassis, which may include a plurality of slots, each of which may be operable to receive an inserted module. The chassis may also include a backplane, which may provide for communication among the

inserted modules. The backplane may include a switched fabric bus and a plurality of instrumentation lines that provide instrumentation signaling functions. The switched fabric bus may be a channel based switched fabric bus, such as the InfiniBand bus. The switched fabric bus may include one or more routers and/or switches, which may selectively provide for communication between the inserted modules. The chassis may further include a plurality of interface connectors coupled to the backplane to connect to respective inserted modules. *See* page 17 line 12 – page 19 line 19 of Appellant's Specification.

In one embodiment, the plurality of instrumentation signaling lines may include one or more reference clock lines for transmitting one or more fixed or variable frequency system reference clock signals that may provide synchronization signals for the inserted modules. The reference clock signals may be generated by one or more reference clocks comprised on one or more of the backplane, one of the inserted modules, or an external system which may be coupled to one of the inserted modules. The reference clock may comprise a differential clock, where the clock signal is determined by the difference of two signals transmitted on two signal lines, respectively. *See* page 20 line 24 – page 21 line 20 of Appellant's Specification.

In one embodiment, the plurality of instrumentation signaling lines may include a trigger bus, which may include a plurality of trigger lines. Each of the plurality of trigger lines may be operable to connect a corresponding slot to the trigger bus. In one embodiment, one or more of the trigger lines may be designed for open-collector signaling. The trigger bus may be operable to communicate trigger signals between the inserted modules for synchronizing operations between the modules. *See* page 20 lines 7-22 of Appellant's Specification.

In one embodiment, the system chassis may include a star trigger controller slot, which may receive an inserted star trigger controller module. The plurality of instrumentation signaling lines may include a star trigger bus, which may include a

plurality of dedicated trigger lines, each connecting the star trigger controller slot to one of the plurality of instrumentation slots. The star trigger bus may communicate precision trigger signals generated by the inserted star trigger controller module to the inserted modules in each of the plurality of slots. Each of the dedicated trigger lines may be of equal length to provide matched propagation times of the trigger signals. In one embodiment, one or more of the dedicated trigger lines may be designed for differential signaling. *See* page 21 line 21 – page 22 line 5 of Appellant's Specification.

In one embodiment, the instrumentation system may include a system controller slot, which may receive an inserted system controller module. The inserted system controller module may provide system controller functions in the instrumentation system. In one embodiment, the system controller module may comprise a computer module, which may provide computer functions in the instrumentation system. In another embodiment, the system controller module may comprise an interface for coupling to an external system, such as a computer system. *See* page 16 lines 6-16 of Appellant's Specification.

VI. GROUNDS OF REJECTION

1. Claims 1-8, 10-11, 13, 15, 17-26, and 29-34 stand rejected under 35 U.S.C. §103(a) as being unpatentable over PXI Specification (Revision 1.0, August 20, 1997) (hereinafter "PXI Specification") in view of InfiniBand Architecture Specification (Volume 1, Release 1.0, October 24, 2000) (hereinafter "InfiniBand Specification").
2. Claim 9 stands rejected under 35 U.S.C. §103(a) as being unpatentable over PXI Specification in view of InfiniBand Specification, and further in view of Doblar et al. (U.S. Publication 2001/0013100) (hereinafter "Doblar").
3. Claim 12 stands rejected under 35 U.S.C. §103(a) as being unpatentable over PXI Specification in view of InfiniBand Specification, and further in view of Lee et al. (U.S. Patent 5,040,158) (hereinafter "Lee").
4. Claim 14 stands rejected under 35 U.S.C. §103(a) as being unpatentable over PXI Specification in view of InfiniBand Specification, and further in view of Bell et al. (U.S. Patent 6,356,140) (hereinafter "Bell").
5. Claim 16 stands rejected under 35 U.S.C. §103(a) as being unpatentable over PXI Specification in view of InfiniBand Specification, and further in view of Ohta et al. (U.S. Patent 5,414,635) (hereinafter "Ohta").
6. Claims 27-28 stand rejected under 35 U.S.C. §103(a) as being unpatentable over PXI Specification in view of InfiniBand Specification, and further in view of Shaffer et al. (U.S. Patent 6,349,286) (hereinafter "Shaffer").
7. Claims 35-39 stand rejected under 35 U.S.C. §103(a) as being unpatentable over InfiniBand Specification in view of PXI Specification.

VII. ARGUMENT

A. Claims 1-13 and 15-28

The Examiner rejected claims 1-13 and 15-28 under 35 U.S.C. §103(a) as being unpatentable over PXI Specification in view of InfiniBand Specification. Appellant respectfully traverses these rejections in light of the following remarks.

In order to reject a claim as obvious, the Examiner has the burden of establishing a *prima facie* case of obviousness. *In re Warner* et al., 379 F.2d 1011, 154 U.S.P.Q. 173, 177-178 (C.C.P.A. 1967). To establish a *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974), MPEP § 2143.03.

The PXI Specification and the InfiniBand Specification do not appear to disclose, teach, or suggest, "An instrumentation system, comprising…a switched fabric bus; and a plurality of instrumentation signaling lines which provide instrumentation signaling functions" as recited in claim 1. (Emphasis added)

The Examiner asserts, on page 13 of the Office Action dated November 19, 2005, "the claims did not specify how the Infiniband bus and instrumentation lines work/operate together." Appellant respectfully disagrees. Claim 1 recites, in part, "a backplane, comprising: a switched fabric bus; and a plurality of instrumentation signaling lines which provide instrumentation signaling functions; and a plurality of interface connectors coupled to the backplane, wherein each of the connectors is operable to connect to a respective inserted module; wherein the backplane is operable to provide for communication among the inserted modules." (Emphasis added) Appellant submits that it is clear from Claim 1 that the backplane, which includes the switched fabric bus and the instrumentation signaling lines "which provide instrumentation signaling fuctions", "provide for communication among the inserted modules".

Appellant respectfully submits that the PXI Specification and the InfiniBand Specification, do not appear to teach or suggest an instrumentation system using the InfiniBand bus with instrumentation lines "to provide for communication among the inserted modules".

The Examiner also asserts, on page 13 of the Office Action dated November 19, 2005, that the motivation to combine the PXI Specification and the InfiniBand Specification is found on page 33 of the InfiniBand Specification (i.e., InfiniBand bus provides communication between devices) and on pages 34-35 of the InfiniBand Specification, which discloses, in part, "IBA can support bandwidths that are anticipated to remain an order of magnitude greater than prevailing I/O media (SCSI, Fibre Channel, Ethernet)...IBA supports implementations as simple as a single computer system, and can be expanded" Appellant strongly disagrees. The complete paragraphs of the InfiniBand Specification referenced by the Examiner state:

> "IBA can support bandwidths that are anticipated to remain an order of magnitude greater than prevailing I/O media (SCSI, Fibre Channel, Ethernet). This ensures its role as the common interconnect for attaching I/O media using these technologies. Reinforcing this point is IBA's native use of IPv6 headers, which supports extremely efficient junctions between IBA fabrics and traditional internet and intranet infrastructures.
>
> IBA supports implementations as simple as a single computer system, and can be expanded to include: replication of components for increased system reliability, cascaded switched fabric components, additional I/O units for scalable I/O capacity and performance, additional host node computing elements for scalable computing, or any combinations thereof. InfiniBand Architecture is a revolutionary architecture that enables computer systems to keep up with the ever increasing customer requirement for increased scalability, increased bandwidth, decreased CPU utilization, high availability, high isolation, and support for Internet technology." (Page 35, Paragraphs 1-2, InfiniBand Specification)

Appellant respectfully notes:

> Determination of obviousness cannot be based on the hindsight combination of components selectively culled from the prior art to fit the parameters of the patented invention. There must be a teaching or suggestion within the prior art, or within the general knowledge of a person of ordinary skill in the field of the invention, to look to particular sources of information, to select particular elements, and to combine them in the way they were combined by the inventor. (*ATD Corporation v. Lydall, Inc.*, 48 USPQ 2d 1321, 1329 (Fed. Cir. 1998)). (Emphasis added)

Furthermore, the Office Action has not stated a prima facie case of obviousness for combining the PXI Specification and the InfiniBand Specification. As stated in the MPEP §2142:

> To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). (Emphasis added)

There is no teaching or suggestion to combine the PXI Specification and the InfiniBand Specification either in the references (including the paragraphs referenced by the Examiner) or in the prior art. As held by the U.S. Court of Appeals for the Federal Circuit in Ecolochem Inc. v. Southern California Edison Co., an obviousness claim that lacks evidence of a suggestion or motivation for one of skill in the art to combine prior art references to produce the claimed invention is defective as hindsight analysis. (Emphasis added)

Furthermore, the showing of a suggestion, teaching, or motivation to combine prior teachings "must be clear and particular . . .. Broad conclusory statements regarding the teaching of multiple references, standing alone, are not 'evidence'." *In re Dembiczak*,

175 F.3d 994, 50 USPQ2d 1614 (Fed. Cir. 1999). (Emphasis added) The art must fairly teach or suggest to one to make the specific combination as claimed. That one achieves an improved result by making such a combination is no more than hindsight without an initial suggestion to make the combination.

Additionally, the Examiner states, on page 3 of the Office Action dated November 19, 2005, "It would have been obvious to one of ordinary skill in the art at the time the invention was made to implement InfiniBand bus as taught by the InfiniBand Spec in the system of PXI Spec to provide high speed communication between modules." Appellant strongly disagrees. Appellant respectfully submits that the Examiner's "broad conclusory statements" on pages 3 and 13 of the Office Action are defective hindsight analysis.

In sum, Appellant respectfully asserts that there is no suggestion in the prior art for combining and, and that even were the two references combined, they would not produce the system of at least Claims 1-13 and 15-28. Since the rejection is not supported by the teaching of the cited references, Appellant respectfully requests reversal of the Examiner's rejection of Claims 1-13 and 15-28.

B. Claims 29-34

The Examiner rejected claims 29-34 under 35 U.S.C. §103(a) as being unpatentable over PXI Specification in view of InfiniBand Specification. Appellant respectfully traverses these rejections in light of the following remarks.

The rejection of claims 29-34 is unsupported by the cited reference for at least the reasons given above in Argument A. In addition, the PXI Specification and InfiniBand Specification do not appear to disclose, teach, or suggest, "The instrumentation system, comprising...a switched fabric bus; and a plurality of instrumentation signaling lines which provide instrumentation signaling functions; a plurality of interface connectors coupled to the switched fabric bus and to the plurality of lines, wherein each of the

connectors is operable to connect to a respective inserted module" as recited in claim 29. (Emphasis added)

The Examiner asserts, on pages 6-7 of the Office Action dated November 19, 2005, that the arguments made for claim 1 also apply to claim 29. Appellant strongly disagrees. Claim 29 recites, in part, "a backplane, comprising: a switched fabric bus; and a plurality of instrumentation signaling lines which provide instrumentation signaling functions; a plurality of interface connectors coupled to the switched fabric bus and to the plurality of lines, wherein each of the connectors is operable to connect to a respective inserted module; wherein the backplane is operable to provide for communication among the inserted modules." (Emphasis added) Appellant submits that it is clear from Claim 29 that the switched fabric bus and the plurality of instrumentation signaling lines, "which provide instrumentation signaling functions", are connected to the interface connectors and that the interface connectors are coupled to the modules. Also, it is clear from Claim 29 that via the switched fabric bus and the instrumentation signaling lines the backplane "provide for communication among the inserted modules".

Appellant respectfully submits that the PXI Specification and the InfiniBand Specification, do not appear to teach or suggest an instrumentation system using the InfiniBand bus with instrumentation lines "to provide for communication among the inserted modules".

Additionally, Appellant disagrees that the motivation to combine the PXI Specification and the InfiniBand Specification is found on pages 33-35 of the InfiniBand Specification for the same reasons described above in Argument A.

Appellant respectfully submits that the Examiner's "broad conclusory statements" on pages 6-7 and 13 of the Office Action dated November 19, 2005 are defective hindsight analysis.

In sum, Appellant respectfully asserts that there is no suggestion in the prior art for combining and, and that even were the two references combined, they would not produce the system of at least Claims 29-34. Since the rejection is not supported by the teaching of the cited references, Appellant respectfully requests reversal of the Examiner's rejection of Claims 29-34.

C. Claim 14

The Examiner rejected Claim 14 under 35 U.S.C. §103(a) as being unpatentable over PXI Specification in view of InfiniBand Specification, and further in view of Bell. Appellant respectfully traverses these rejections in light of the following remarks.

The rejection of claim 14 is unsupported by the cited reference for at least the reasons given above in Argument A. In addition, the PXI Specification, InfiniBand Specification, and Bell do not appear to disclose, teach, or suggest, "The instrumentation system…wherein the trigger bus comprises at least one open-collector signal line" as recited in claim 14. (Emphasis added) The Examiner contends that this feature is taught in column 2 lines 30-48 and column 5 lines 28-66 of Bell. Appellant respectfully disagrees. Also, Appellant again respectfully asserts that that Examiner appears to be combining references with improper hindsight based on the Appellant's disclosure.

In sum, Appellant respectfully asserts that there is no suggestion in the prior art for combining and, and that even were the three references combined, they would not produce the system of at least claim 14. Since the rejection is not supported by the teaching of the cited references, Appellant respectfully requests reversal of the Examiner's rejection of Claims 14.

D. Claim 35-39

The Examiner rejected Claim 35-39 under 35 U.S.C. §103(a) as being unpatentable over PXI Specification in view of InfiniBand Specification. Appellant respectfully traverses these rejections in light of the following remarks.

In order to reject a claim as obvious, the Examiner has the burden of establishing a *prima facie* case of obviousness. *In re Warner* et al., 379 F.2d 1011, 154 U.S.P.Q. 173, 177-178 (C.C.P.A. 1967). To establish a *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974), MPEP § 2143.03.

The PXI Specification and InfiniBand Specification do not appear to disclose, teach, or suggest, "An instrumentation system, comprising...a switched fabric bus; and a plurality of instrumentation signaling lines which provide instrumentation signaling functions; a plurality of interface connectors coupled to the switched fabric bus and to the plurality of lines, wherein each of the connectors is operable to connect to a respective inserted module" as recited in claim 35. (Emphasis added)

The Examiner asserts, on page 13 of the Office Action dated November 19, 2005, "the claims did not specify how the Infiniband bus and instrumentation lines work/operate together." Appellant strongly disagrees. Claim 35 recites, in part, "a backplane, comprising: a switched fabric bus; and a plurality of instrumentation signaling lines which provide instrumentation signaling functions; a plurality of interface connectors coupled to the switched fabric bus and to the plurality of lines, wherein each of the connectors is operable to connect to a respective inserted module; wherein the backplane is operable to provide for communication among the inserted modules." (Emphasis added) Appellant submits that it is clear from Claim 35 that the switched fabric bus and the plurality of instrumentation signaling lines, "which provide instrumentation signaling functions", are connected to the interface connectors and that

the interface connectors are coupled to the modules. Also, it is clear from Claim 35 that via the switched fabric bus and the instrumentation signaling lines the backplane "provide for communication among the inserted modules".

Appellant respectfully submits that the PXI Specification and the InfiniBand Specification, do not appear to teach or suggest an instrumentation system using the InfiniBand bus with instrumentation lines "to provide for communication among the inserted modules".

Additionally, Appellant disagrees that the motivation to combine the PXI Specification and the InfiniBand Specification is found on pages 33-35 of the InfiniBand Specification for the same reasons described above in Argument A.

Appellant respectfully notes:

> Determination of obviousness cannot be based on the hindsight combination of components selectively culled from the prior art to fit the parameters of the patented invention. There must be a teaching or suggestion within the prior art, or within the general knowledge of a person of ordinary skill in the field of the invention, to look to particular sources of information, to select particular elements, and to combine them in the way they were combined by the inventor. (*ATD Corporation v. Lydall, Inc.*, 48 USPQ 2d 1321, 1329 (Fed. Cir. 1998)). (Emphasis added)

Furthermore, the Office Action has not stated a prima facie case of obviousness for combining the PXI Specification and the InfiniBand Specification. As stated in the MPEP §2142:

> To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim

> limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). (Emphasis added)

There is no teaching or suggestion to combine the PXI Specification and the InfiniBand Specification either in the references (including the paragraphs referenced by the Examiner) or in the prior art. As held by the U.S. Court of Appeals for the Federal Circuit in Ecolochem Inc. v. Southern California Edison Co., an obviousness claim that lacks evidence of a suggestion or motivation for one of skill in the art to combine prior art references to produce the claimed invention is defective as hindsight analysis. (Emphasis added)

Furthermore, the showing of a suggestion, teaching, or motivation to combine prior teachings "must be clear and particular . . .. Broad conclusory statements regarding the teaching of multiple references, standing alone, are not 'evidence'." *In re Dembiczak*, 175 F.3d 994, 50 USPQ2d 1614 (Fed. Cir. 1999). (Emphasis added) The art must fairly teach or suggest to one to make the specific combination as claimed. That one achieves an improved result by making such a combination is no more than hindsight without an initial suggestion to make the combination.

Additionally, the Examiner states, on page 12 of the Office Action dated November 19, 2005, "It would have been obvious to one of ordinary skill in the art at the time the invention was made to implement instrumentation chassis as taught by PXI Spec to provide instrumentation functions in the system of InfiniBand Spec." Appellant strongly disagrees. Appellant respectfully submits that the Examiner's "broad conclusory statements" on pages 12 and 13 of the Office Action are defective hindsight analysis.

In sum, Appellant respectfully asserts that there is no suggestion in the prior art for combining and, and that even were the two references combined, they would not produce the system of at least Claims 35-39. Since the rejection is not supported by the

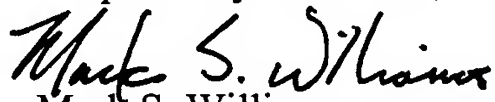
teaching of the cited references, Appellant respectfully requests reversal of the Examiner's rejection of Claims 35-39.

VIII. CONCLUSION

For the foregoing reasons, it is submitted that the Examiner's rejections of claims 1-39 were erroneous, and reversal of Examiner's decision is respectfully requested.

The Commissioner is authorized to charge the appeal brief fee of $500.00 and any other fees that may be due to Meyertons, Hood, Kivlin, Kowert, & Goetzel, P.C. Deposit Account No. 501505/5150-51201/JCH. This Appeal Brief is submitted in triplicate along with a return receipt postcard.

Respectfully submitted,



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IX. CLAIMS APPENDIX

The claims on appeal are as follows.

1. An instrumentation system, comprising:

a chassis, comprising:

a plurality of slots, wherein each of the plurality of slots is operable to receive an inserted module;

a backplane, comprising:

a switched fabric bus; and

a plurality of instrumentation signaling lines which provide instrumentation signaling functions; and

a plurality of interface connectors coupled to the backplane, wherein each of the connectors is operable to connect to a respective inserted module;

wherein the backplane is operable to provide for communication among the inserted modules.

2. The instrumentation system of claim 1, wherein the switched fabric bus is a channel based switched fabric bus.

3. The instrumentation system of claim 2, wherein the channel based switched fabric bus is the InfiniBand bus.

4. The instrumentation system of claim 1, wherein the switched fabric bus includes one or more routers and/or switches which are operable to selectively provide for communication between the inserted modules.

5. The instrumentation system of claim 1, wherein the plurality of instrumentation signaling lines include:

at least one local bus, wherein the at least one local bus provides for adjacent slot communication for one or more of analog signals or digital signals.

6. The instrumentation system of claim 5, wherein the at least one local bus is operable to connect each of at least a subset of the plurality of slots with its adjacent slots, wherein the at least one local bus is operable to provide a communication path between the inserted modules for one or more of analog signals or side-band digital communications.

7. The instrumentation system of claim 1, wherein the plurality of instrumentation signaling lines include:

one or more lines for transmitting one or more system reference clock signals, wherein the one or more system reference clock signals are operable to provide synchronization signals for the inserted modules.

8. The instrumentation system of claim 7, wherein the reference clock signals are generated by a reference clock comprised on one or more of the backplane, one of the inserted modules, or an external system which is coupled to one of the inserted modules.

9. The instrumentation system of claim 8, wherein the reference clock comprises a differential clock.

10. The instrumentation system of claim 8, wherein the reference clock comprises a fixed frequency reference clock.

11. The instrumentation system of claim 8, wherein the reference clock comprises a variable frequency reference clock.

12. The instrumentation system of claim 7, wherein the reference clock signals are generated by two or more reference clocks comprised on one or more of the

backplane, one of the inserted modules, or an external system which is coupled to one of the inserted modules.

13. The instrumentation system of claim 1, wherein the plurality of instrumentation signaling lines include:

a trigger bus, wherein the trigger bus comprises a plurality of trigger lines, wherein each of the plurality of trigger lines is operable to connect a respective one of the plurality of slots to the trigger bus, and wherein the trigger bus is operable to communicate trigger signals between the inserted modules.

14. The instrumentation system of claim 13, wherein the trigger bus comprises at least one open-collector signal line.

15. The instrumentation system of claim 1, further comprising:

a star trigger controller slot, wherein the star trigger controller slot is operable to receive an inserted star trigger controller module;

wherein the plurality of instrumentation signaling lines include a star trigger bus, wherein the star trigger bus comprises a plurality of dedicated trigger lines, each connecting the star trigger controller slot to one of the plurality of slots, wherein the star trigger bus is operable to communicate precision trigger signals between the inserted star trigger controller module and in each of the inserted modules in the plurality of slots.

16. The instrumentation system of claim 15, wherein at least a subset of said dedicated trigger lines comprise one or more differential triggers.

17. The instrumentation system of claim 15, wherein each of the dedicated trigger lines is of equal length to provide matched propagation times of the trigger signals.

18. The instrumentation system of claim 1, wherein the plurality of instrumentation signaling lines include a low voltage analog bus.

19. The instrumentation system of claim 1, wherein the plurality of instrumentation signaling lines include a high voltage analog bus.

20. The instrumentation system of claim 1, wherein the plurality of instrumentation signaling lines include one or more of:

a local bus;

system reference clock signals;

a trigger bus; and

a star trigger bus.

21. The instrumentation system of claim 1, wherein the plurality of instrumentation signaling lines include two or more of:

a local bus;

system reference clock signals;

a trigger bus; and

a star trigger bus.

22. The instrumentation system of claim 1, wherein the plurality of instrumentation signaling lines include three or more of:

a local bus;

system reference clock signals;

a trigger bus; and

a star trigger bus.

23. The instrumentation system of claim 1, wherein the plurality of instrumentation signaling lines include two or more of:

a local bus;

system reference clock signals;

a trigger bus;

a star trigger bus;

a low voltage analog bus; and

a high voltage analog bus.

24. The instrumentation system of claim 1, further comprising:

one or more instrumentation modules, wherein each of the one or more instrumentation modules is operable to be inserted into a respective one of the plurality of slots, wherein the backplane is operable to logically couple to each of the one or more instrumentation modules when inserted into the slots;

wherein each of the one or more instrumentation modules is operable to perform instrumentation functions in the instrumentation system.

25. The instrumentation system of claim 1, further comprising:

a system controller slot, wherein the system controller slot is operable to receive an inserted system controller module, wherein the inserted system controller module is operable to provide system controller functions in the instrumentation system.

26. The instrumentation system of claim 25, wherein the system controller module comprises a computer module, wherein the computer module is operable to provide computer functions in the instrumentation system.

27. The instrumentation system of claim 25, wherein the system controller module comprises an interface for coupling to an external system.

28. The instrumentation system of claim 27, wherein the external system comprises a computer system.

29. The instrumentation system of claim 1, further comprising:

one or more additional chassis coupled to said chassis via a transmission medium, each of said additional chassis comprising:

a plurality of slots, wherein each of the plurality of slots is operable to receive an inserted module;

a backplane, comprising:

a switched fabric bus; and

a plurality of instrumentation signaling lines which provide instrumentation signaling functions;

a plurality of interface connectors coupled to the switched fabric bus and to the plurality of lines, wherein each of the connectors is operable to connect to a respective inserted module;

wherein the backplane is operable to provide for communication among the inserted modules.

30. The instrumentation system of claim 29,

wherein the plurality of signaling lines of said chassis are operable to transmit instrumentation signals through the transmission medium to said one or more additional chassis, and wherein the plurality of instrumentation signaling lines of said one or more additional chassis are operable to provide the instrumentation signals to one or more inserted modules in said one or more additional chassis.

31. The instrumentation system of claim 29,

wherein said plurality of signaling lines of each of said chassis and said one or more additional chassis are operable to communicate instrumentation signals through the transmission medium with any others of said chassis and said one or more additional chassis, thereby providing for communication between inserted modules of any of said chassis and said one or more additional chassis.

32. The instrumentation system of claim 29,

wherein the transmission medium comprises one or more transmission cables; and

wherein said chassis and said one or more additional chassis are daisy-chained together by said one or more transmission cables, respectively.

33. The instrumentation system of claim 29,

wherein the transmission medium comprises a network.

34. The instrumentation system of claim 33,

wherein the network comprises the Internet.

35. An instrumentation system, comprising:

a computer system;

a chassis;

a cable coupling the computer system and the chassis, wherein the cable transmits switched fabric bus signals between the computer system and the chassis;

wherein the chassis comprises:

a plurality of slots, wherein each of the plurality of slots is operable to receive an inserted module;

a backplane, comprising:

a switched fabric bus; and

a plurality of instrumentation signaling lines which provide instrumentation signaling functions;

a plurality of interface connectors coupled to the switched fabric bus and to the plurality of lines, wherein each of the connectors is operable to connect to a respective inserted module;

wherein the backplane is operable to provide for communication among the inserted modules.

36. The instrumentation system of claim 35, wherein the plurality of instrumentation signaling lines include one or more of:

a local bus;

system reference clock signals;

a trigger bus; and

a star trigger bus.

37. The instrumentation system of claim 35, wherein the plurality of instrumentation signaling lines include one or more of:

a local bus;

system reference clock signals;

a trigger bus;

a star trigger bus;

a low voltage analog bus; and

a high voltage analog bus.

38. The instrumentation system of claim 35,

wherein the switched fabric bus is a channel based switched fabric bus.

39. The instrumentation system of claim 38, wherein the channel based switched fabric bus is the InfiniBand bus.

X. EVIDENCE APPENDIX

None

X. RELATED PROCEEDINGS APPENDIX

None